Comments on the Nature of the Florida Middle Ground Reef Ichthyofauna*

Gregory B. Smith
Florida Department of Natural Resources
Marine Research Laboratory
St. Petersburg, Florida

Larry H. Ogren
NOAA/National Marine Fisheries Service
Gulf Coastal Fisheries Center
Panama City, Florida

The Florida Middle Ground is an extensive offshore area of rugged submarine terrain located along the outer West Florida Shelf (28° 11' to 28° 45' N.; 84° 00' to 84° 25' W.) approximately 95 miles south of the Florida northwest coast and 100 miles northwest of Tampa. The entire region is characterized by steep-profiled escarpments and prominences which may precipitously rise 35 to 50 feet from the surrounding bottom. Depths throughout the area vary between 78 and 138 feet. Brooks (1962) has suggested that much of the Middle Ground topography is due to underlying Pleistocene reefs which flourished during the last interglacial, the Sangamon.

Historically, the Florida Middle Ground has been one of the most productive and consistently fished "reef areas" in the Gulf of Mexico. As early as 1883, commercial vessels sailed from Pensacola to fish for red snapper (Lutjanus campechanus) at the Florida Middle Ground (Futch and Torpey, 1966). In spite of heavy and continuous fishing pressure, the Middle Ground still remains a productive source of both commercial and sport fishes (Austin, 1970). Presently, most of the commercial grouper-snapper fishing effort on the West Florida Shelf is centered at the Middle Ground, Elbow and adjacent reef fisheries. In addition, several new partyboats capable of cruising 20 to 30 knots leave daily from Clearwater and St. Petersburg to fish the Middle Ground and other deep-water reefs on the outer West Florida Shelf. More conventional partyboats and sportsfishing vessels periodically depart from Panama City, Tarpon Springs, Dunedin, Clearwater, St. Petersburg and Sarasota. These feature 2 or 3 day fishing trips to the Middle Ground. Consequently the Middle Ground and nearby reef fisheries represent a sizable source of economy to the state of Florida. In 1971, 6,356,360 pounds of groupers with a dockside value of $1,272,475, and 5,800,171 pounds of snappers valued at $2,941,717 were brought into ports along Florida's west coast (Johnson, 1972). Although a substantial portion of these

*Contribution No. 238, FDNR/MRL

landings reflect the success of the Campeche (Mexico) fishery, a significant faction also represents production on the West Florida Shelf. When values accrued at steps from landing, processing, and retailing the catch are added to these figures paid to the fishermen, the monetary significance of the West Florida Shelf bottom fishery becomes even more impressive.

Certain physiographic, hydrological and biological features have allowed the development of a rich and abundant biota, dominated by tropical elements, at the Middle Ground. "Reef" crests are covered with invertebrates and benthic algae typical of deepwater West Indian reefs (Austin, 1970). Brooks (1962) postulated that the presence of scleractinian and alcyonarian corals, hydrocorals and coralline algae were comparable to those of reefs in the Florida Keys. Reef fishes are also largely characteristic of more southerly regions within Caribbean and West Indian faunal provinces. The occurrence of numerous fishes which represent distributional records (e.g. eastern Gulf, northward range extension, etc.) emphasize the ichthyofaunal distinctiveness of the Middle Ground region.

Buffered environmental conditions associated with offshore distance and moderating current patterns confer a certain stability to the Middle Ground region and allow for successful occupation by numerous stenotolerant tropical reef fishes. Because of certain conditions associated with its offshore location, the Middle Ground may be considered primarily an insular rather than continental environment. Consequently, clear oceanic waters, shallow reef crests, steep-profiled bottom topography and carbonate sediments at the Middle Ground are attractive to insular (West Indian) reef fishes which are either rare or absent at other areas of the West Florida Shelf.

The relative constancy of physical-chemical characteristics has probably allowed the evolution of a predominately biologically accommodated community at the Middle Ground. In the absence of certain environmental limiting factors, biological stresses are ultimately resolved through the evolution of biological accommodation resulting in "stable, complex and buffered assemblages.... characterized by a large number of stenotopic species" (Sanders, 1968). Through biological accommodation, certain interspecific relationships considerably more complex than simple predator-prey interactions have evolved. For example, the occurrence and conspicuous abundance of cleaning symbionts (organisms which remove ectoparasites and necrotic tissue from the bodies of certain host fishes) such as the neon goby (Gobiosoma oceanops), juvenile bluehead wrasse (Thalassoma bifasciatum), banded coral shrimp (Stenopus hispidus) and cleaner shrimp of the genus Periclimenes undoubtedly affect the overall complexion of the Florida Middle Ground ichthyofauna. Certain investigators (Limbaugh, 1961; Mahnken, 1972) have speculated that the diversity of coral reef fish assemblages may be profoundly influenced by the presence of cleaning organisms and Feder (1966) asserted that many good fishing grounds are such primarily because they are cleaning stations.

Another feature which permits a greater species diversity and abundance at the Florida Middle Ground is the physiographic heterogeneity of

the environment. Unlike most other areas of the West Florida Shelf, the Middle Ground is characterized by high relief ledges and rocky outcroppings which afford greater surface area, available shelter and microhabitats for more kinds and numbers of fishes.

The Florida Middle Ground receives ichthyofaunal contributions from both inshore, shallow reef communities and offshore, deep reef communities because of its proximity to the outer West Florida Shelf and tremendous depth differentials. This "edge effect" may partially account for the increased variety of the Middle Ground ichthyofauna. The Middle Ground is a zoogeographically transitional region in that it receives warm-temperate, eurythermic, insular tropical (West Indian), continental tropical (Caribbean) and Gulf of Mexico endemic ichthyofaunal elements. However, a qualitative comparison of the Middle Ground ichthyofauna with those of other reefal sites in the Gulf of Mexico and western Atlantic indicates both greater intra-Gulf homogeneity and Caribbean-West Indian affinity than previously suspected for these populations.

Dynamic hydrographic conditions favor seasonal upwelling and associated high primary productivity along the seaward edge of the Middle Ground. Zooplankton volumes comparable to concentrations detected in known regions of upwelling off Peru, southern California and west Africa have been documented at the Middle Ground (Austin, 1970). This situation obviously contributes to the tremendous populations of plankton-feeding fishes (primarily Chromis and Apogon) at the Middle Ground, a condition not nearly so apparent at most other reef sites on the West Florida Shelf. These planktivorous fishes are significant importers of food into the reef community and permit a greater diversity in species composition (Starck and Davis, 1966). A definite correlation is therefore proposed between water column productivity, abundance of planktivorous fishes and the overall dominance-diversity structure of the Middle Ground ichthyofauna.

In summary, a fortuitous combination of physical, chemical and biological features has contributed to the development of a Middle Ground reef ichthyofauna which is quite distinctive (both qualitatively and quantitatively) from that of other reef areas on the West Florida Shelf. There exists a growing concern that increased bottom turbidities and sedimentation which might be generated during exploratory oil-drilling operations could seriously jeopardize the ecology of a productive reef community such as exists at the Middle Ground. Because the water column overlying the Middle Ground is frequently stratified, it is feared that increased turbidities below the thermocline due to the release of drilling muds, drill cuttings and physical disruption of the substrate might effectively reduce light penetration below the critical limit necessary to sustain the coral (hermatypic) and algal assemblages so characteristic of the Middle Ground region. It is a unique situation which has not previously been encountered in other areas of the Gulf where oil-drilling operations are currently in progress. These latter regions are dominated by warm-temperate, soft bottom faunas which exhibit rather broad tolerances to environmental parameters. The tropical reef community at the Florida Middle Ground, however, would be many times more sensitive to environmental perturbations often affiliated with oil exploitation and production.

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Reprinted from R. E. Smith, ed. Proceedings of Marine Environmental Implications of Offshore Drilling in the Eastern Gulf of Mexico. Conference/Workshop. Jan 31, Feb. 1, 2, 1974. State Univ. Sys. Fla. Inst. Oceanogr., St. Petersburg, Florida.